WELDLESS PLATFORM ASSEMBLY

BACKGROUND OF THE INVENTION

Field of the Invention

[0001] The present invention relates to support structures and, more particularly, to platforms of the type used in industrial plants.

Description of the Prior Art

[0002] Conventional industrial platforms are typically made from hot-rolled I-beams and/or H-beams welded together. Such structures are relatively heavy and complex to build.

[0003] There is thus a need for a new industrial platform system which is lightweight, relatively easy to assemble, and cheap while still being of a sturdy construction.

SUMMARY OF THE INVENTION

[0004] It is therefore an aim of the present invention to a new platform system comprising a weldless frame.

[0005] It is also an aim of the present invention to provide a new platform system wherein at least some of the skeleton components thereof are made from metal sheets cut and folded into beams of predetermined cross-sections.

[0006] Therefore, in accordance with a general aspect of the present invention, there is provided an industrial platform assembly comprising a weldless frame including at least three cold-formed profiles bolted together so as to define a support plane, a cold-formed support column at each corner of said frame, said cold-formed support column being bolted to said weldless frame.

[0007] In accordance with a further general aspect of the present invention, there is provided a blank for use in forming a guard rail post, comprising a flat strip of bendable metal, a pair of parallel fold lines defining therebetween a central longitudinally extending web portion and along which the sheet is folded to form a pair of opposed longitudinally extending sidewalls, and at least one hole defined in said web portion and extending transversally beyond said fold lines to form a pair of registered recesses in said sidewalls once folded.

[0008] In accordance with a further general aspect of the present invention, there is provided a platform supporting column formed from a strip of metal by a cold-forming process, the column comprising first and second folded portions extending at about 90 degrees with respect to each other, each said folded portions having a longitudinal terminal edge which terminates into a flange oriented at about 90 degrees from the folded portions, each said flange leaving an open side on said column.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] Having thus generally described the nature of the invention, reference will now be made to the accompanying drawings, showing by way of illustration a preferred embodiment thereof, and in which:

[00010] Fig. 1 is a perspective view of a fully assembled modular industrial platform section in accordance with an embodiment of the present invention;

[00011] Fig. 2 is a perspective view of a cold-formed structural profile shown with unfolded connection tabs at opposed longitudinal ends thereof;

[00012] Fig. 3 is a perspective view of a cold-formed structural steel with folded connection tabs;

[00013] Fig. 4 is a perspective view of a cold-formed structural steel column;

[00014] Fig. 5 is a top plan view of one corner connection of the industrial platform shown in Fig. 1;

[00015] Fig. 6 is an elevation view of a guard rail forming part of the industrial platform shown in Fig. 1; and

[00016] Fig. 7 is a plan view of a blank for use in forming a guard rail post.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[00017] Fig. 1 shows a modular platform 10 that can be employed to provide workers with a suitable and safe area from which they can perform their tasks, whether inside an industrial plant, or beside a particular structure. The platform could also be used as a stage system.

[00018] According to one aspect of the present invention, the platform 10 is characterized by the fact that the skeleton components thereof are all bolted together, thereby eliminating the complicated and time consuming assembly weldment

procedures normally required in the erection of conventional industrial platforms. The provision of such a weldless platform is rendered possible, notably, by the fact that the platform skeleton components are made from metal sheets cut and folded into beam members of predetermined cross-section (see Figs. 3 to 5).

[00019] As shown in Fig. 1, the modular platform 10 comprises a number of horizontal C-shaped beams 12 bolted to each other in order to provide a rigid square-rectangular framework on which is supported a grate or a similar support surface. It is understood that other shapes of framework are contemplated as well. For instance, three C-shaped beams 12 could be used to form a triangular frame. Additional C-shaped beams 12 could also be added to increase the surface covered by the frame.

[00020] As best seen in Figs. 2 and 3, the C-shaped beams 12 are preferably made from planar sheets of steel cut into strips of predetermined length and then folded into C-shaped profiles. Connection tabs 14 are provided at opposed longitudinal ends of each beam 12. As shown in Fig. 3, the connection tabs 14 can be folded at right angles. A series of holes 16 are defined in each tab 14 for allowing the cold-formed beams 12 to be mechanically connected as by bolting. As shown in Fig. 1, other holes 17 can be defined at various locations along the central web portion 18 of the C-shaped beams 12 for allowing transversal C-shaped braces, such as the one shown at 12' in Fig. 1, to be bolted at right angles between parallel C-shaped braces 12 of the frame. The transversal brace 12' is similar to the C-shaped beams 12 defining the perimeter of the frame and thus the duplicate description thereof will be omitted.

[00021] In accordance to the present invention, the number of C-shaped braces needed to solidify the frame can be advantageously minimized by providing small corners braces 20 at each corner of the frame. In certain cases, the use of the corner braces 20 can completely eliminate the need for long transversal braces.

[00022] The horizontal corner braces 14 are also made of bent metal sheets and have the same profile as the C-shaped beams 12 and 12'. However, their connecting tabs 14' are bent at 45 degrees instead of 90 degrees for allowing the corner braces 20 to be directly bolted to the web portion 18 of the adjacent C-shaped beams 12 at each corner of the frame. The tabs 14' can be embossed at various locations along the fold

line thereof to increase the structural rigidity thereof. The triangular corner linking structures defined by the corner braces 20 and the beams 12 advantageously provides an overall stiffer frame structure with less weight than conventional frame structures having right angles bracing structures.

[00023] As shown in Fig. 1, the above-described rectangular frame is supported at each corner thereof by a vertical column 22. Each column 22 is preferably provided in the form of a cold-formed profile made from sheets of steel cut and folded in elongated members of constant section throughout the length thereof. As known in the art, diagonal braces typically extend between the columns 22 to provide structural stability.

[00024] The profile of each column 22 is best seen in Figs. 4 and 5 and is characterized by two open faces. The particular shape of the vertical columns 22 is important in that the two open faces greatly facilitate the mechanical connection of the columns 16 to the horizontal beams 12 of the modular platform 10. As shown in Fig. 5, the two open faces of each column are positioned inwardly of the frame and provide ready access to the interior of the column to facilitate tightening of the bolts 24 used to directly mechanically connect the columns 22 to the horizontal cold-formed beams 12.

[00025] As shown in Fig. 4, each column 22 has a pair of longitudinally extending walls 26 and 28 projecting at right angles to each other. Longitudinally spaced-apart holes (not shown) can be provided at the upper end of both walls 26 and 28 or, alternatively, in only one of them to permit direct bolting of the columns 22 to the connection tabs 14 of the interconnected horizontal beams 12. According to the example shown in Fig. 5, both beams 12 are bolted to wall 28 of column 22. One of the beams 12 is provided with a straight connection tab 14, whereas the second beam 12 is provided with a folded connection tab 14. The folded tab 14 of the second beam 12 is placed against the outer surface of wall 28 and thereafter the straight tab 14 of the first beam is superposed thereover with the holes 16 in the tabs 14 being in registry with corresponding holes in the wall 28 for receiving bolts 24.

[00026] As shown in Figs. 4 and 5, the terminal vertical edges of the walls 26 and 28 merge into flanges 30 and 32 respectively oriented at right angles to the walls

26 and 28 so as to extend in the internal facing sides of the vertical column 22 once attached to the beams 12. The flanges 30 and 32 extend only part way through the internal facing sides of the column 22 so as to leave the major portion thereof open.

[00027] As shown in Fig. 1, the platform section 10 is provided with a guard rail assembly 34 along at least a portion of the perimeter thereof. The guard rail assembly 34 comprises a number of posts 36 and two levels of tubular rails 38. The guard rail posts 36 are made from a blank 40 (Fig. 7) cut in a metal sheet. The blank 40 is folded about two parallel longitudinal fold lines 42 to form a central web portion 44 and a pair of sidewalls 46 extending at substantially right angles to the central web portion 44. An oblong hole 48 is defined through the web portion between the opposed longitudinal ends of the blank and is oriented at right angle relative to a longitudinal axis of the blank. As shown in Fig. 7, the hole 48 extends laterally outwardly of the central web 44 beyond the fold lines 42 into the sidewalls 46. This results in the provision of an open-ended socket in the backside of the blank 40 once bent cold into a C-shaped post. As shown in Fig. 6, the bottom tubular rail 38 is received in the open-ended socket and secured therein as by welding. The upper end of the blank 40 is similarly cut to define a transversally oriented elongated recess 50 (Fig. 7). The recess 50, once the blank 40 has been folded, provides a seat in which the top tubular rail 38 can be welded. As shown in Fig. 1, the posts 36 are installed to the frame with the open side thereof facing outwardly from the frame. Mounting holes (not shown) can be defined in the bottom end portion of the central web portion 44 of each post 36 for allowing them to be directly bolted to the beams 12.

[00028] This new guard rail post concept, which is made from cut and folded metal sheets, is advantageous in that it facilitates the installation of the tubular hand rails 22 compared to conventional tubular posts.

[00029] It is understood that the above-described platform section can advantageously be attached to other similar platform sections to form a modular platform construction of almost infinite mounting permutations.

[00030] The above-described platform construction is also advantageous in that it is lightweight while being strong. The size of the frame members is small as

compared to conventional industrial platform. By making the beams 12, the corner braces 20 and the columns 22 from metal sheets cut and folded into the desired profile, the production time can be significantly reduced. This results in lower costs. The elimination of the welding procedures also greatly contributes to lower the production costs. Also, unlike conventional platforms, the present platform does not require special tools or expertise in order to assemble.